Listing of the Claims

1. (Currently Amended)   A method for producing a corrected reconstructed image from acquired tomographic projection data, the method including:

reconstructing acquired projection data (60) corresponding to a region into an uncorrected reconstructed image (74);

classifying pixels of the uncorrected reconstructed image (74) at least into high density, medium density, and low density pixel classes;

replacing pixels of the uncorrected reconstructed image (74) that are of the high density and low density classes with pixel values of the low density pixel class to generate a synthetic image (90);

forward projecting the synthetic image (90) to generate synthetic projection data (96);

replacing acquired projection data (60) contributing to the pixels of the high density class with corresponding synthetic projection data (96) to generate corrected projection data (112); and

reconstructing the corrected projection data (112) into a corrected reconstructed image (120).

2. (Currently Amended)   The method as set forth in claim 1, wherein the replacing of pixels of the uncorrected reconstructed image (74) that are of the high density and low density classes with pixel values of the low density pixel class includes:

computing an average value of pixels of the low density pixel class; and

replacing pixels of the uncorrected reconstructed image (74) that are of the high density and low density classes with the average value of pixels of the low density pixel class.

3. (Currently Amended)   The method as set forth in claim 1, wherein the region is a slice and the uncorrected reconstructed image (74) is a two-dimensional image, the method further including:

repeating the reconstructing of acquired projection data (60), the classifying, the replacing of pixels, the forward projecting, the replacing of acquired projection data (60), and the reconstructing of the corrected projection data (112) for acquired projection data corresponding to each of a plurality of two-dimensional slices; and

combining the two-dimensional reconstructed images (120) corresponding to the plurality of two-dimensional slices to generate a three-dimensional corrected reconstructed image.

4. (Currently Amended)   The method as set forth in claim **1**, wherein the replacing of acquired projection data ~~(60)~~ contributing to the pixels of the high density class with corresponding synthetic projection data ~~(96)~~ includes:

during the replacing, interpolatively adjusting the synthetic projection data ~~(96)~~ to smooth transitions between the synthetic projection data ~~(96)~~ and the acquired projection data ~~(60)~~.

5. (Currently Amended)   The method as set forth in claim **1**, wherein the replacing of acquired projection data ~~(60)~~ contributing to the pixels of the high density class with corresponding synthetic projection data ~~(96)~~ includes:

identifying a high density image region substantially comprised of pixels of the high density class; and

performing the replacing for acquired projection data ~~(60)~~ contributing to the high density image region.

6. (Currently Amended)   The method as set forth in claim **5**, wherein the region is a slice, the uncorrected reconstructed image ~~(74)~~ is a two-dimensional image, the acquired projection data ~~(60)~~ is in a sinogram format, and the replacing of acquired projection data ~~(60)~~ contributing to the pixels of the high density class with corresponding synthetic projection data ~~(96)~~ further includes:

replacing the acquired projection data **(60)** with replacement projection data μd_{repl} having values given by:

$$\mu d_{repl}(n) = \mu d_{synth}(n) + a\left(\frac{n_2 - n}{n_2 - n_1}\right) + b\left(\frac{n - n_1}{n_2 - n_1}\right)$$

where $a=[\mu d_0(n_1) - \mu d_{synth}(n_1)]$, $b=[\mu d_0(n_2) - \mu d_{synth}(n_2)]$, n is a line integral index, indices n_1 and n_2 are line integral indices corresponding to the edges ~~(106)~~ of the high density image region with replacement being performed for $n_1 \leq n \leq n_2$, μd_0 indicates acquired projection data ~~(60)~~, and μd_{synth} indicates synthetic projection data ~~(96)~~.

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7. (Currently Amended)   The method as set forth in claim **5**, wherein the region is a slice, the uncorrected reconstructed image ~~(74)~~ is a two-dimensional image, the acquired projection data ~~(60)~~ is in a sinogram format, and the replacing of acquired projection data ~~(60)~~ contributing to the pixels of the high density class with corresponding synthetic projection data ~~(96)~~ further includes:

for at least one view of the sinogram corresponding to a view angle, repeating the identifying of a high density image region and the performing of the replacing for acquired projection data ~~(60)~~ contributing to the high density image region for at least two non-contiguous high density image regions.

8. (Currently Amended)   The method as set forth in claim **5**, wherein the identifying of a high density image region substantially comprised of pixels of the high density class includes:

applying an edge detection algorithm to identify edges ~~(106)~~ of the high density image region.

9. (Currently Amended)   The method as set forth in claim **8**, wherein the performing of the replacing for acquired projection data ~~(60)~~ contributing to the high density image region includes:

interpolating between the acquired projection data ~~(60)~~ and the synthetic projection data ~~(96)~~ adjacent the identified edges ~~(106)~~ of the high density image region.

10. (Currently Amended)   The method as set forth in claim **5**, wherein the identifying of a high density image region substantially comprised of pixels of the high density class includes:

performing binary thresholding of the uncorrected reconstructed image ~~(74)~~ using a threshold that assigns a first binary value to pixels of the high density pixel class and that assigns a second binary value to pixels not of the high density pixel class; and

identifying edges ~~(106)~~ of the high density image region as transitions from pixels of the first binary value to pixels of the second binary value.

11. (Original) The method as set forth in claim **5**, further including:

superimposing a label on the high density image region.

12. (Currently Amended)   The method as set forth in claim **1**, wherein the reconstructing of the acquired projection data (60) and the reconstructing of the corrected projection data (112) each include:

reconstructing the projection data (60, 112) using filtered backprojection.

13. (Currently Amended)   The method as set forth in claim **1**, wherein the acquired tomographic projection data (60) is from a computed tomography scanner (10) and is in a cone-beam geometry, and the forward projecting includes:

forward projecting the synthetic image (90) to generate synthetic projection data (96) in the cone-beam geometry.

14. (Original)   The method as set forth in claim **1**, wherein:

the high density pixel class corresponds at least to metallic material;

the medium density pixel class corresponds at least to bone; and

the low density pixel class corresponds at least to soft tissue.

15. (Currently Amended)   The method as set forth in claim **14**, wherein:

the classifying of pixels of the uncorrected reconstructed image (74) further includes classifying pixels of the uncorrected reconstructed image (74) into an air density pixel class having a maximum density that is lower than a minimum density of the low density pixel class; and

the replacing of pixels of the uncorrected reconstructed image (74) to generate the synthetic image (90) includes replacing pixels of the uncorrected reconstructed image (74) that are of the air density class with an average value of pixels of the air density pixel class.

16. (Currently Amended)   The method as set forth in claim **15**, wherein the classifying of pixels of the uncorrected reconstructed image (74) further includes classifying pixels of the uncorrected reconstructed image (74) into a transition density pixel class spanning a density range between the maximum density of the air density pixel class and the minimum density of the low density pixel class.

17. (Currently Amended)   The method as set forth in claim **1**, wherein the replacing of pixels of the uncorrected reconstructed image (74) does not include replacing pixels of the medium density pixel class.

18. (Currently Amended)   An apparatus for producing a corrected reconstructed image (120, 124) from acquired tomographic projection data (60), the apparatus including:

a reconstructing means (70) for reconstructing acquired projection data (60) corresponding to a region into an uncorrected reconstructed image (74);

a classifying means (78) for classifying pixels of the uncorrected reconstructed image (74) at least into high density, medium density, and low density pixel classes;

a pixel replacement means (88) for replacing pixels of the uncorrected reconstructed image (74) that are of the high density and low density classes with pixel values of the low density pixel class to generate a synthetic image (90);

a forward projecting means (94) for forward projecting the synthetic image (90) to generate synthetic projection data (96); and

a projection replacement means (100, 110) for replacing acquired projection data (60) contributing to the pixels of the high density class with corresponding synthetic projection data (96) to generate corrected projection data (112);

the reconstructing means (70) reconstructing the corrected projection data (112) into a corrected reconstructed image (120).

19. (Currently Amended)   The apparatus as set forth in claim 18, wherein the projection replacement means (100, 110) includes:

an edge finding means (100) for finding edges (106) of one or more high density regions consisting essentially of pixels of the high density pixel class.

20. (Currently Amended)   The apparatus as set forth in claim 19, wherein the projection replacement means (100, 110) further includes:

an interpolating replacement means (110) for interpolatively replacing acquired projection data (60) with synthetic projection data (96) at the edges (106) of the high density regions.

21. (Currently Amended)   The apparatus as set forth in claim 19, further including:

a labeling processor (122) for substituting pixels defining a preselected label for pixels of the corrected reconstructed image (120) corresponding to the one or more high density regions.

22. (Currently Amended)   The apparatus as set forth in claim **18**, wherein the classifying means (78) accesses a set of threshold values (42) including at least:

a medium density/high density threshold value defining a minimum density of the high density pixel class and a maximum density of the medium density pixel class, and

a low density/medium density threshold value defining a minimum density of the medium density pixel class and a maximum density of the low density pixel class; and

the classifying means (78) classifying pixels of the uncorrected reconstructed image (74) at least into high density, medium density, and low density pixel classes based on comparison of pixel values with the set of threshold values (42).

23. (Currently Amended)   The apparatus as set forth in claim **22**, wherein the set of threshold values (42) further include:

a low density/transition density threshold defining a minimum density of the low density pixel class and a maximum density of a transition density pixel class, and

a transition density/air density threshold defining a minimum density of the transition density pixel class and a maximum density of an air density pixel class,

wherein the classifying means (78) further classifies pixels of the uncorrected reconstructed image (74) into transition density and air density pixel classes based on comparison of pixel values with the set of threshold values.

24. (Currently Amended)   The apparatus as set forth in claim **23**, wherein the pixel replacement means (88) further replaces pixels of the uncorrected reconstructed image (74) that are of the air density pixel class with an average value of pixels of the air density pixel class.

25. (Currently Amended)   The apparatus as set forth in claim **18**, further including:

a means (10) for acquiring the acquired tomographic projection data (60), the means for acquiring including at least an x-ray source (12), a detector array (16), and a rotating gantry (20) on which the x-ray source (12) and the detector array (16) are mounted, the acquired tomographic projection data (60) being acquired during rotation of the rotating gantry (20).

26. (Currently Amended)   A radiographic scanner including:

a computed tomography scanner (10) including at least an x-ray source (12), a detector array (16), and a rotating gantry (20) on which the x-ray source (12) and the detector array (16) are mounted, the scanner (10) acquiring tomographic projection data (60) during rotation of the rotating gantry (20); and

a processor (40) for producing a corrected reconstructed image (120, 124) from the acquired tomographic projection data (60), the processor (40) performing a method including:

reconstructing acquired projection data (60) corresponding to a region into an uncorrected reconstructed image (74),

classifying pixels of the uncorrected reconstructed image (74) at least into high density, medium density, and low density pixel classes,

replacing pixels of the uncorrected reconstructed image (74) that are of the high density and low density classes with pixel values of the low density pixel class to generate a synthetic image (90),

forward projecting the synthetic image (90) to generate synthetic projection data (96),

replacing acquired projection data (60) contributing to the pixels of the high density class with corresponding synthetic projection data (96) to generate corrected projection data (112), and

reconstructing the corrected projection data (112) into a corrected reconstructed image (120).